

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A resin tube-equipped quick connector for connecting a fuel-transporting resin tube to a mating pipe, comprising a connector body, a C-shaped retainer and a seal member;

wherein the connector body has a generally tubular shape as a whole, has a retainer holding portion adapted to receive and hold the C-shaped retainer in an axial opening at one axial end thereof, and also has at an opposite axial end thereof, a press-fitting portion which is press-fitted into the interior of the resin tube from one end thereof,

wherein an exterior of the press-fitting portion consists of the following portions along an axial length L thereof, one immediately after another:

a first truncated-conical-shaped portion extending from a ring-shaped end face on a tip end of the press-fitting portion;

a first cylindrical-shaped root portion,

a first truncated-conical-shaped annular projection followed by a first ring-shaped face and a second cylindrical-shaped root portion,

a second truncated-conical-shaped annular projection followed by a second ring-shaped face and a third cylindrical-shaped root portion,

a second truncated-conical-shaped portion, which ends abutting with a flat ring-shaped end face of the connector body,

~~wherein the retainer holding portion includes first and second windows opening through opposite curved sides thereof,~~

~~wherein the C-shaped retainer includes a first arc-shaped portion which projects outwardly into the first window of the retainer holding portion, and a second arc-shaped portion which projects outwardly into the second window of the retainer holding portion;~~

~~wherein the C-shaped retainer includes a retainer side engagement portion having first and second arc-shaped windows which open on opposite sides thereof in a radial direction, which are adapted to engage with a convex pipe side engagement portion from a radially inward side, formed on an outer peripheral surface of the mating pipe and spaced from an axial insertion side end thereof, so as to fix the inserted mating pipe in the axial direction; and~~

~~when the mating pipe is fixed in an axial direction in the C-shaped retainer, and the C-shaped retainer is held in the connector body, the convex engagement portion of the mating pipe is visible when viewed through each of the first and second windows of the retainer holding portion;~~

~~wherein the seal member is mounted within the connector body at an inner region thereof disposed closer to the press-fitting portion than the retainer holding portion is disposed, and the seal member is brought into contact with an outer peripheral surface of an insertion end portion of the inserted mating pipe disposed closer to a distal end of the mating pipe than the pipe side engagement portion is disposed, thereby forming an air-tight seal between the insertion end portion and an inner surface of the connector body; and~~

wherein the resin tube includes a press-fit undergoing portion into which the press-fitting portion is press-fitted,

wherein the press-fit undergoing portion of the resin tube into which the press-fitting portion is press-fitted has an internal diameter d_3 substantially equal to 3.5, and a portion of the resin tube into which the press-fitting portion is not press-fitted has an internal diameter d_1 substantially equal to 2.5, and

wherein a ratio of an axial length L of the press-fitting portion to an inner diameter d_4 of the press-fitting portion is substantially equal 7.25 to 1.0.

2. (Currently Amended) The resin tube-equipped quick connector as claimed in claim 1, wherein the retainer holding portion includes first and second windows opening through opposite curved sides thereof.

wherein the C-shaped retainer includes a first arc-shaped portion which projects outwardly into the first window of the retainer holding portion, and a second arc-shaped portion which projects outwardly into the second window of the retainer holding portion,

wherein the C-shaped retainer includes a retainer-side engagement portion having first and second arc-shaped windows which open on opposite sides thereof in a radial direction, which are adapted to engage with a convex pipe-side engagement portion from a radially-inward side, formed on an outer peripheral surface of the mating pipe and spaced

from an axial insertion-side end thereof, so as to fix the inserted mating pipe in the axial direction; and

when the mating pipe is fixed in an axial direction in the C-shaped retainer, and the C-shaped retainer is held in the connector body, the convex engagement portion of the mating pipe is visible when viewed through each of the first and second windows of the retainer holding portion,

wherein the seal member is mounted within the connector body at an inner region thereof disposed closer to the press-fitting portion than the retainer holding portion is disposed, and the seal member is brought into contact with an outer peripheral surface of an insertion end portion of the inserted mating pipe disposed closer to a distal end of the mating pipe than the pipe-side engagement portion is disposed, thereby forming an air-tight seal between the insertion end portion and an inner surface of the connector body, and

wherein the retainer is elastically deformable radially, a retainer-side retaining engagement portion is capable of being fitted to a body-side retaining engagement portion, formed at the retainer holding portion of the connector body, from a radially-inward side to be retained and fixed in the axial direction, the retainer also including:

at least one of an inner peripheral cam surface for elastically expanding the retainer when inserting the mating pipe into the retainer and an outer peripheral cam surface for elastically reducing the diameter of the retainer when inserting the retainer into the retainer holding portion.

3. (Cancelled)

4. (Previously Presented) The resin tube-equipped quick connector as claimed in claim 1 or 2, wherein a protector is fitted on the resin tube to cover an outer peripheral surface of the resin tube.

5. (Previously Presented) The resin tube-equipped quick connector as claimed in claim 1 or 2, wherein the resin tube has a multi-layer structure an inner layer of the resin tube is more excellent in gasoline resistance than an outer layer.

6. (Cancelled)

7. (Previously Presented) The resin tube-equipped quick connector as claimed in claim 1, wherein the resin tube includes an inner diameter of not larger than 5 mm.

8. (Currently Amended) A resin tube-equipped quick connector for connecting a fuel-transporting resin tube to a mating pipe, comprising:

a connector body, a C-shaped retainer and a seal member;

wherein the connector body has a generally tubular shape as a whole, and has a retainer holding portion adapted to receive and hold the C-shaped retainer in an axial opening

at one axial end thereof, and also has at an other axial end thereof, a press-fitting portion which is press-fitted into the interior of the resin tube from one end thereof;

wherein an exterior of the press-fitting portion consists of the following portions along an axial length L thereof, one immediately after another:

a first truncated-conical-shaped portion extending from a ring-shaped end face on a tip end of the press-fitting portion;

a first cylindrical-shaped root portion,

a first truncated-conical-shaped annular projection followed by a first ring-shaped face and a second cylindrical-shaped root portion,

a second truncated-conical-shaped annular projection followed by a second ring-shaped face and a third cylindrical-shaped root portion,

a second truncated-conical-shaped portion, which ends abutting with a flat ring-shaped end face of the connector body,

wherein the retainer holding portion includes first and second box-shaped windows opening through opposite curved sides thereof;

~~wherein the C-shaped retainer includes a first arc-shaped portion which projects outwardly into the first box-shaped window of the retainer holding portion, and a second arc-shaped portion which projects outwardly into the second box-shaped window of the retainer holding portion;~~

~~wherein the C-shaped retainer includes a retainer side engagement portion having first and second arc-shaped windows which open on opposite sides thereof in a radial~~

direction, which are adapted to engage with a convex pipe side engagement portion from a radially inward side, formed on an outer peripheral surface of the mating pipe and spaced from an axial insertion side end thereof, so as to fix the inserted mating pipe in the axial direction; and

when the mating pipe is fixed in an axial direction in the C-shaped retainer, and the C-shaped retainer is held in the connector body, the convex engagement portion of the mating pipe is visible when viewed through each of the first and second windows of the retainer holding portion;

the seal member is mounted within the connector body at an inner region thereof disposed closer to the press fitting portion than the retainer holding portion is disposed, and the seal member is brought into contact with an outer peripheral surface of an insertion end portion of the inserted mating pipe disposed closer to a distal end of the mating pipe than the pipe side engagement portion is disposed, thereby forming an air-tight seal between the insertion end portion and an inner surface of the connector body; and

a press-fit undergoing portion of the resin tube, into which the press-fitting portion is to be press-fitted, has an inner diameter that is expanded prior to press-fitting, and the press-fit undergoing portion is press-fitted in the tube diameter-expanded press-fit undergoing portion to be integrated therewith in a withdrawal-preventing condition,

wherein the press-fit undergoing portion of the resin tube into which the press-fitting portion is press-fitted has an internal diameter d_3 substantially equal to 3.5, and a

portion of the resin tube into which the press-fitting portion is not press-fitted has an internal diameter d_1 substantially equal to 2.5,

and a ratio of an axial length L of the press-fitting portion to an inner diameter d_4 of the press-fitting portion is substantially equal 7.25 to 1.0.

9. (Previously Presented) The resin tube-equipped quick connector as claimed in claim 14, wherein

the first truncated-conical-shaped annular projection is closer to a distal end of the press-fitting portion than the second truncated-conical-shaped annular projection.

10. (Currently Amended) The resin tube-equipped quick connector as claimed in ~~claim 15~~ claim 8, wherein

~~the first truncated conical shaped annular projection is closer to a distal end of the press-fitting portion than the second truncated conical shaped annular projection~~

the C-shaped retainer includes a first arc-shaped portion which projects outwardly into the first box-shaped window of the retainer holding portion, and a second arc-shaped portion which projects outwardly into the second box shaped window of the retainer holding portion,

wherein the C-shaped retainer includes a retainer-side engagement portion having first and second arc-shaped windows which open on opposite sides thereof in a radial direction, which are adapted to engage with a convex pipe-side engagement portion from a

radially-inward side, formed on an outer peripheral surface of the mating pipe and spaced from an axial insertion-side end thereof, so as to fix the inserted mating pipe in the axial direction; and

when the mating pipe is fixed in an axial direction in the C-shaped retainer, and the C-shaped retainer is held in the connector body, the convex engagement portion of the mating pipe is visible when viewed through each of the first and second windows of the retainer holding portion,

the seal member is mounted within the connector body at an inner region thereof disposed closer to the press-fitting portion than the retainer holding portion is disposed, and the seal member is brought into contact with an outer peripheral surface of an insertion end portion of the inserted mating pipe disposed closer to a distal end of the mating pipe than the pipe-side engagement portion is disposed, thereby forming an air-tight seal between the insertion end portion and an inner surface of the connector body.

11. (Cancelled)

12. (Previously Presented) The resin tube-equipped quick connector as claimed in claim 14, no portion of the press-fitting portion has an outer diameter larger than an outer diameter d_5 of each of the truncated-conical-shaped annular projections.

13. (Previously Presented) The resin tube-equipped quick connector as claimed in claim 15, no portion of the press-fitting portion has an outer diameter larger than an outer diameter $d5$ of each of the truncated-conical-shaped annular projections.

14. (Currently Amended) The resin tube-equipped quick connector as claimed in claim 1,

wherein the axial length L of the press-fitting portion is 14.5 mm, and the inner diameter $d4$ of the press-fitting portion is 2.0 mm.

15. (Currently Amended) The resin tube-equipped quick connector as claimed in claim 8,

wherein the axial length L of the press-fitting portion is 14.5 mm, and the inner diameter $d4$ of the press-fitting portion is 2.0 mm.

16. (Previously Presented) The resin tube-equipped quick connector as claimed in claim 1, further comprising a bushing mounted within the connector body at a region deeper than the retainer holding portion.

17. (Currently Amended) A coupling structure of a quick connector and a resin tube for connecting a fuel-transporting resin tube to a mating pipe, comprising: a connector body,

a retainer, and

a seal member;

wherein the connector body has a generally tubular shape as a whole, and has a retainer holding portion at one axial side thereof, and also has at the other side thereof a press-fitting portion which is press-fitted into the interior of the resin tube from one end thereof,

wherein an exterior of the press-fitting portion consists of the following portions along an axial length L thereof, one immediately after another:

a first truncated-conical-shaped portion extending from a ring-shaped end face on a tip end of the press-fitting portion;

a first cylindrical-shaped root portion,

a first truncated-conical-shaped annular projection followed by a first ring-shaped face and a second cylindrical-shaped root projection,

a second truncated-conical-shaped annular projection followed by a second ring-shaped face and a third cylindrical-shaped root portion,

a second truncated-conical-shaped portion, which ends abutting with a flat ring-shaped end face of the connector body,

wherein the retainer holding portion includes first and second windows opening through opposite curved sides thereof,

wherein the retainer is a member adapted to be held in the retainer holding portion, and includes:

a first arc-shaped portion which projects outwardly into the first window of the retainer holding portion, and a second arc-shaped portion which projects outwardly into the second window of the retainer holding portion, and

a retainer-side engagement portion having first and second arc-shaped windows which open on opposite sides thereof in a radial direction, which are adapted to engage with a convex pipe-side engagement portion from a radially-inward side, formed on an outer peripheral surface of the mating pipe and spaced from an axial insertion-side end thereof, so as to fix the inserted mating pipe in the axial direction; and

when the mating pipe is fixed in an axial direction in the retainer, and the retainer is held in the connector body, the first and second arc-shaped recesses engaging the convex pipe-side engagement portion of the mating pipe are located under each of the first and second windows of the retainer holding portion,

wherein the seal member is mounted within the connector body at an inner region thereof disposed closer to the press-fitting portion than the retainer holding portion is disposed, and the seal member is brought into contact with an outer peripheral surface of an insertion end portion of the inserted mating pipe disposed closer to a distal end of the mating pipe than the pipe-side engagement portion is disposed, thereby forming an air-tight seal between the insertion end portion and an inner surface of the connector body; and

wherein the resin tube is a small-diameter tube having an inner diameter of not larger than 5 mm,

wherein the resin tube includes a press-fit undergoing portion into which the press-fitting portion is press-fitted,

wherein the press-fit undergoing portion of the resin tube into which the press-fitting portion is press-fitted has an internal diameter d_3 substantially equal to 3.5, and a portion of the resin tube into which the press-fitting portion is not press-fitted has an internal diameter d_1 substantially equal to 2.5,

wherein a ratio of an axial length L of the press-fitting portion to an inner diameter d_4 of the press-fitting portion is substantially equal 7.25 to 1.0.

18. (Previously Presented) The coupling structure of a quick connector and a resin tube as in claim 17, wherein the retainer is elastically deformable radially, and a retainer-side retaining engagement portion is capable of being fitted to a body-side retaining engagement portion, formed at the retainer holding portion of the connector body, from a radially-inward side to be retained and fixed in the axial direction, the retainer also including:

at least one of an inner peripheral cam surface for elastically expanding the retainer when inserting the mating pipe into the retainer and an outer peripheral cam surface for elastically reducing the diameter of the retainer when inserting the retainer into the retainer holding portion.

19. (Previously Presented) The coupling structure of a quick connector and a resin tube as in claim 17, further comprising a protector fitted on the resin tube to cover an outer peripheral surface of the resin tube.

20. (Currently Amended) The coupling structure of a quick connector and a resin tube as in claim 17, ~~where the resin tube has a multi-layer structure, having at least an inner layer and an outer layer, the inner layer being more resistant to gasoline than is the outer layer wherein the axial length L of the press-fitting portion is 14.5 mm. and the inner diameter d4 of the press-fitting portion is 2.0 mm.~~

21. (Previously Presented) The coupling structure of a quick connector and a resin tube as in claim 17, wherein the resin tube comprises a polyamide resin.

22. (Previously Presented) The coupling structure of a quick connector and a resin tube as in claim 17,

wherein an outer diameter d6 of a root portion provided between the first and second truncated-conical-shaped annular projections and an inner diameter d3 of the tube diameter-expanded press-fit undergoing portion are substantially the same, and

wherein the axial length L of the press-fitting portion and an axial length L of the press-fitting undergoing portion are substantially the same.

23. (Currently Amended) The resin tube-equipped quick connector as claimed in claim 1, wherein before the press-fitting portion is press-fitted into the press-fit undergoing portion, the press-fit undergoing portion is formed with an inner diameter that is substantially equal to an outer diameter d6 of the root portions of the press-fitting portion, and after the press-fitting portion is press-fitted into the press-fit undergoing portion of the resin tube, the press-fit undergoing portion is adapted to cause portions of its inner diameter d3 facing the root portions to become equal to the outer diameter d6 of the root portions, so that and the press-fit undergoing portion is integrated with the press-fitting portion in a withdrawal-preventing condition.